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**FACSIMILE TRANSMITTAL**

**TO**

**Name:** Mr. Ben Utecht  
**Firm:** U.S.P.T.O.  
**Fax No.:** (703) 872-9355  
**Subject:** Serial No. 09/671,201

**Phone No.:** (703) 308-3836  
**Date:** March 6, 2002

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**FROM**

**Name:** David W. Hill  
**Fax # Verified by:** Sylvia Helms  
**Our File No.:** 07553.0009

**Phone No.:** (202) 408-4020  
**# Pages (incl. this):** 13

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**Confirmation Copy to Follow: [Y/N]**

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7553.0009

DHI/KRM

**PLEASE STAMP TO ACKNOWLEDGE RECEIPT OF THE FOLLOWING:**

In Re Application of: Michiaki SANO

Serial No.: 09/671,201

Group Art Unit: 1765

Filed: September 28, 2000

Examiner: Lan Vinh

For: PLASMA PROCESSING METHOD

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1. Petition to Restart Period for Response to Office Action

Dated February 14, 2002

Docket No.: 07553.0009

David Hill/Kevin Mun/Sylvia Helms - Mail Drop 1030

(Due Date:)



2002 2-14-02 J



## UNITED STATES PATENT AND TRADEMARK OFFICE

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 UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,201	09/28/2000	Michiaki Sano	07553.0009	904

7590 01/09/2002

Finnegan Henderson Farabow Garrett & Dunner LLP  
 1300 I Street NW  
 Washington, DC 20005

EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
1765	3

DATE MAILED: 01/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# RECEIVED

1-29-2002

FINNEGAN, HENDERSON, FARABOW,  
 GARRETT AND DUNNER, LLP

Docketed 2-7-02 Attorney DWH  
 Case 7553.0009  
 Due Date 4-9-02 w/e  
 Action RESENT  
 By J. S. - 2-7-02 w/e

<b>Office Action Summary</b>	Application N .	Applicant(s)
	09/671,201	SANO, MICHIAKI
	Examiner	Art Unit
	LAN VINH	1765

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 9/26/2000.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-6 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-6 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. 09/671,201.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1, 3, 5, 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al ( US 6,284,149 )

Li discloses a plasma etching process for removing a photoresist film 166, the photoresist film 166 with an opening pattern 168 having an opening area 168 larger than opening area of a hole 22 formed at insulating layer 16 of a substrate/workpiece 10, the opening 168 is used as a mask to plasma etch through the insulating layer 16. This plasma etching process comprises the steps of:

applying a high frequency ( 1.6 MHz) biasing power ( power applies to the substrate holder ) of ( 750 W to the pedestal 72 holding wafer/workpiece 70 ( col 8, lines 45-50, col 18, lines 10-12 and fig. 8 ) reads on applying a high frequency bias power at a first power level to the workpiece

raising the biasing power while flowing fluorocarbon and oxygen gas in the chamber resulting in higher ion energy /plasma ( col 17, lines 55-58 ) reads on raising the processing gas to plasma

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switching the high frequency biasing power at 750 W to the high frequency biasing power at 200 W before clearing/removing the photoresist ( col 17, lines 42-43, col 18, lines 10-15 ) reads on switching the high frequency biasing power level at first power level to the second high frequency biasing power level lower than the power level ( 200 W < 750W ) before the photoresist film is completely removed.

Regarding claims 5-6, Li discloses using photoresist film 166 as a mask to form an opening pattern/specific pattern at silicon dioxide/ organic material film 42 formed on the substrate/ workpiece10 ( col 7, lines 20-23 and fig. 18 )

#### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al ( US 6,284, 149 ) in view of Koshimizu ( US 5,997, 687 )

Li discloses a plasma etching process for removing a photoresist film 166, the photoresist film 166 with an opening pattern 168 having an opening area 168 larger than opening area of a hole 22 formed at insulating layer 16 of a substrate/workpiece 10, the opening 168 is used as a mask to plasma etch through the insulating layer 16. This plasma etching process comprises the steps of:

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applying a high frequency ( 1.6 MHz) biasing power ( power applies to the substrate holder ) of ( 750 W to the pedestal 72 holding wafer/workpiece 70 ( col 8, lines 45-50, col 18, lines 10-12 and fig. 8 ) reads on applying a high frequency bias power at a first power level to the workpiece

raising the biasing power while flowing fluorocarbon and oxygen gas in the chamber resulting in higher ion energy /plasma ( col 17, lines 55-58 ) reads on raising the processing gas to plasma

switching the high frequency biasing power at 750 W to the high frequency biasing power at 200 W before clearing/removing the photoresist ( col 17, lines 42-43, col 18, lines 10-15 ) reads on switching the high frequency biasing power level at first power level to the second high frequency biasing power level lower than the power level ( 200 W < 750W ) before the photoresist film is completely removed.

Li differs from the instant claimed inventions as per claims 2, 4 by switching from high to lower biasing power level before the photoresist is completely removed instead of stopping the biasing power level.

However, Koshimizu discloses a plasma process for etching or ashing ( removing photoresist ) comprises the step of applying/controlling high frequency biasing power at 800 W and 0 W ( stopping the biasing power ) to the workpiece ( col 9, lines 26-31 ) reads on stopping the application of high frequency biasing power to the workpiece.

Hence, one skilled in the art would have found it obvious to modify Li's method of plasma etching by stopping the biasing power level as per Koshimizu especially since Li teaches that biasing power needs to be adjusted ( col 14, lines 4-6 ) and Koshimizu

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discloses that as a result of applying and stopping biasing power level, the pulse plasma can be drawn into the substrate within a predetermined energy range to perform plasma processing. ( col 9, lines 30-38 )

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tatsumi et al ( US 5,354,421 ) , in a dry etching method, discloses that underlying layer selectivity could be improved by lowering the RF bias power.

#### **Conclusion**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is 703 305-6302. The examiner can normally be reached on Monday-Friday 8:30 -6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BENJAMIN L UTECH can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

LV  
January 7, 2002

*Benjamin L. Utech*  
BENJAMIN L. UTECH  
SUPERVISOR OF THE PLACEMENT UNIT  
TECHNICAL CENTER

<b>Notice of References Cited</b>	Application/Control No. 09/671,201	Applicant(s)/Patent Under Reexamination SANO, MICHIAKI	
	Examiner LAN VINH	Art Unit 1765	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-6284148	09-2001	Li et al	216/64
B	US-5997,687	12-1999	Koshimizu	156/345
C	US-5354421	10-1994	Tatsumi et al	156/345
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
O					
P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)	
U		
V		
W		
X		

A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

OMB No. 0651-0011

**INFORMATION DISCLOSURE CITATION**  
 (Use ~~veral~~ sheets if necessary)

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Atty. Docket No. 07553.0009		Serial No. Not Yet Assigned				
Applicant Michiaki SANO						
Filing Date September 28, 2000		Group				
<b>U.S. PATENT DOCUMENTS</b>						
Examiner Initial*	Document Number	Date	Name	Class	Sub Class	Filing Date If Appropriate
<b>FOREIGN PATENT DOCUMENTS</b>						
	Document Number	Date	Country	Class	Sub Class	Translation Yes or No
LV	10-27789	1/27/98	Japan			Abstract
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)</b>						
Examiner LAN VINA	Date Considered 1/7/2002					
*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.						

Form PTO 1449

Patent and Trademark Office - U.S. Department of Commerce

**Attachment for PTO-948 (Rev. 03/01, or earlier)**  
6/18/01

**The below text replaces the pre-printed text under the heading, "Information on How to Effect Drawing Changes," on the back of the PTO-948 (Rev. 03/01, or earlier) form.**

**INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

**1. Correction of Informalities -- 37 CFR 1.85**

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTO-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the Notice of Allowability. Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136(a) or (b) for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

**2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.**

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made other than correction of informalities, unless the examiner has approved the proposed changes.

**Timing of Corrections**

**Applicant is required to submit the drawing corrections within the time period set in the attached Office communication. See 37 CFR 1.85(a)**

**Failure to take corrective action within the set period will result in ABANDONMENT of the application.**